

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): R.A. Budd et al.
Docket No.: YOR920000326US2
Serial No.: 10/764,638
Filing Date: January 26, 2004
Group: 2629
Examiner: Alexander S. Beck

Title: Compact Optical System and Packaging
for Head Mounted Display

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Sir:

Applicants (hereinafter referred to as “Appellants”) hereby appeal the rejection of claim 1 of the above referenced application.

REAL PARTY IN INTEREST

The present application is assigned to International Business Machines Corporation. The assignee, International Business Machines Corporation, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals and interferences.

STATUS OF CLAIMS

The present application is a divisional of U.S. Patent Application No. 09/626,749, filed on July 27, 2000, which issued as U.S. Patent No. 6,747,611 on June 8, 2004.

The present application was filed on January 26, 2004, with claims 1-3. Originally-filed claims 2 and 3 have been canceled without prejudice and only independent claim 1 remains pending.

Claim 1 stands rejected under 35 U.S.C. §103(a). Claim 1 is appealed.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a compact head mounted virtual image display unit. The unit includes a microdisplay and an optical system for directing an image signal for viewing by a user. The image signal is generated in accordance with the microdisplay. The unit also includes an optical system mounting structure for supporting the optical system within the field of view of only a single eye of the user and a housing to substantially contain at least the optical system. The unit further includes a slidable opaque light shield, integrated within the housing and having an open position and a closed position. The opaque light shield is slidable along a length of an exterior wall of the housing and slidably positioned with respect to the optical system such that, in the open position, the image signal is viewed by the user together with background light entering the optical system, and in the closed position, the image signal is viewed by the user with background light blocked from entering the optical system and thereby eliminated.

In an illustrative embodiment, a compact head mounted virtual image display unit (e.g., 10 in FIG. 3) includes a microdisplay (e.g., 1100 in FIG. 5) and an optical system (e.g., shown in FIG. 5) for directing an image signal for viewing by a user, in which the image signal is generated in accordance with the microdisplay, as discussed in the specification at, for example, page 9, line 8, to page 10, line 12, with reference to FIG. 5. As described in the specification at, for example, page 6, line 23, to page 7, line 20, with reference to FIG. 3, and page 8, lines 7-12, with reference to FIG. 4,

the unit also includes an optical system mounting structure (e.g., boom 200 and/or pod 300 in FIG. 3) for supporting the optical system within the field of view of only a single eye of the user and a housing (e.g., 100 in FIG. 3) to substantially contain at least the optical system. As described in the specification at, for example, page 13, lines 1-14, with reference to FIG. 9, the unit further includes a slidable opaque light shield (e.g., 3200 in FIG. 9), integrated within the housing and having an open position (e.g., shown in FIG. 9A) and a closed position (e.g., shown in FIG. 9B); the opaque light shield is slidable along a length of an exterior wall of the housing and slidably positioned with respect to the optical system such that, in the open position, the image signal is viewed by the user together with background light entering the optical system, and in the closed position, the image signal is viewed by the user with background light blocked from entering the optical system and thereby eliminated.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,034,653 (hereinafter “Robertson”) in view of U.S. Patent No. 6,452,572 (hereinafter “Fan”).

ARGUMENT

Rejection of claim 1 under §103(a) over Robertson and Fan

Regarding the §103(a) rejection of claim 1, Appellants respectfully reassert that claim 1 recites patentable subject matter for at least the reasons presented in Appellants’ previous responses, as well as the reasons presented below.

Claim 1 includes a limitation directed to an opaque light shield slidable along a length of an exterior wall of the housing of a compact head mounted virtual image display unit. In the arrangement recited in claim 1, the image signal may be viewed by the user with the light shield in both an open and a closed positions; the only difference is in the amount of background light which enters the optical system while the image signal is being viewed by the user. In the open position, the image signal is viewed by the user together with background light entering the optical system, and in the closed position, the image signal is viewed by the user with background light blocked from entering the optical system and thereby eliminated.

In formulating the present rejection of claim 1, the Examiner concedes that Robertson fails to teach an opaque light shield as recited in claim 1. Indeed, Robertson discloses an interface pod that is transmissive or see-through and hence has no light shield. See Robertson at column 8, lines 10-25.

The Examiner instead alleges that Fan discloses an opaque light shield at column 23, lines 40-46. Appellants respectfully submit that, rather than disclosing a light shield, the relied-upon portion of Fan discloses a “protective shade 1102 [that] can be raised or lowered to protect the display panel 1000, the viewing lens 1150 and other internal components from damage.”

Rather than having a closed position wherein an image signal is viewed by the user with background light blocked from entering the optical system and thereby eliminated, as recited in claim 1, this protective shade completely covers a display in a display housing when closed, such that when the protective shade in Fan is in the closed position, anything displayed in the optical system cannot be seen. See Fan at column 23, lines 40-46, and FIG. 54. In other words, the protective shade taught by Fan is functionally similar to a conventional camera lens cap, in that the protective shade is operative to protect the lens and other internal components from damage when the device is not in use, but must remain open when the device is in use.

Not only do Robertson and Fan fail to teach or suggest the slidable opaque light shield recited in claim 1, but both references teach away therefrom. Appellants note that the Supreme Court has held that “when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious.” *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1395 (U.S., 2007) (citing *United States v. Adams*, 383 U.S. 39, 50-51, 148 USPQ 479 (1966)).

Robertson at column 7, lines 45-55, with reference to FIG. 14, describes a display including a shutter (indicated by reference numeral 310 in FIG. 14), which may be used “to filter or substantially prevent or occlude distractions to the non-participatory eye of the viewer looking through display device 10,” and which may “be open allowing light and other distractions to the non-participatory eye or partially or completely closed to filter out light or such distractions.” (both with emphasis added)

The slidable opaque light shield recited in claim 1 is slidably positioned with respect to the optical system such that, in the open position, the image signal is viewed by the user together with

background light entering the optical system, and in the closed position, the image signal is viewed by the user with background light blocked from entering the optical system. By contrast, the position of the shutter taught by Robertson has no effect on the amount of background light entering the display pod. Indeed, the shutter and the display pod are positioned in front of different eyes. See FIG. 14; see also Robertson at column 8, lines 4-9.

Moreover, in the Office Action at page 3, last paragraph, the Examiner contends that it would have been obvious to have modified the alleged teachings of Fan directed to “the opaque light shield being provided on the front-end of the optical system (i.e., the end closest to the user’s eye) . . . such that a slidable opaque light shield was provided . . . at the back-end of the optical system (i.e., the end farthest from the user’s eye).”

Appellants respectfully disagree and instead submit that Fan teaches directly away by teaching embodiments which expressly exclude such modifications. For example, Fan at column 6, lines 38-40, specifies that the end of the display farthest from the user’s eye, which Fan calls the “front section 10 is preferably formed from an opaque material such as plastic to block external light 99 from the user’s eye’s [sic].” Fan at column 8, lines 55-59, discloses that in “another preferred embodiment backlight is provided by direct ambient light 99 [t]hrough a light transmissive front housing section 10.”

As such, rather than teaching or suggesting the use of any light shield, Fan in fact discloses an alternative arrangement wherein the amount of background light permitted to enter a display is regulated by altering the material from which a front housing section is formed. Robertson likewise teaches away from the claimed arrangement by teaching the use of a shutter to regulate the amount of background light permitted to enter the non-participatory eye (i.e., the eye other than that over which the display is mounted), rather than the amount of light permitted to enter an optical system.

As such, Appellants respectfully assert that the combined references fail to teach or suggest at least the slidable opaque light shield recited in claim 1, but rather teach away therefrom.

In view of the above, Appellants believe that claim 1 is in condition for allowance, and respectfully request withdrawal of the §103(a) rejection.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "William E. Lewis". The signature is fluid and cursive, with the first name "William" being more prominent and the last name "Lewis" following in a similar style.

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CLAIMS APPENDIX

1. A compact head mounted virtual image display unit, the unit comprising:
a microdisplay;
an optical system for directing an image signal for viewing by a user, the image signal being generated in accordance with the microdisplay;
an optical system mounting structure for supporting the optical system within the field of view of only a single eye of the user;
a housing to substantially contain at least the optical system; and
a slidable opaque light shield, integrated within the housing and having an open position and a closed position, wherein the opaque light shield is slidable along a length of an exterior wall of the housing and slidably positioned with respect to the optical system such that, in the open position, the image signal is viewed by the user together with background light entering the optical system, and in the closed position, the image signal is viewed by the user with background light blocked from entering the optical system and thereby eliminated.

2. (Canceled)

3. (Canceled)

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.